Profile of Suspected Cholera Patients during May – November 2017 in Sanaa City Secondary Analysis

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Authors' contributions

This work was carried out in collaboration among all authors. Author MQ designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors RAN and MAQ assisted in the analyses of the study and managed the literature searches. All authors read and approved the final manuscript.

Original Research Article	*Received 02 October 2020* *Accepted 07 December 2020* *Published 18 December 2020*

ABSTRACT

Introduction: From 27 April to 3 August 2017, 453,175 suspected cholera cases and 1,930 deaths (CFR: 0.4%) have been reported in 95.6% (22/23) of Yemen governorates, and 89.2% (297/333) of the districts.
The five most affected governorates were Amanat Al-Asima, Al Hudaydah, Hajjah, Amran and Dhamar with 53% (239,877/453,175) of the cases reported since 27 April 2017. In amanat al Asimah (Sana'a city) 55563 cases 61 deaths are registered in that period with case fatality rate 0.1% and attack rate 1.68%
Objectives: To study Profile of suspected cholera patients in Sanaa city.
Materials and Methods: A retrospective descriptive study was carried out by using secondary analysis of available data collected from (DTCs), (ORCs) and other health facilities by department of epidemiological surveillance – Sanaa city health office.
Results: A total of 92995 suspected cholera patients were included in the study whereas the average age of study subjects was 22.7 years where standard deviation (SD) 18.8 most affected age groups were (15-29),(5-14),(<5) the predominant of the study subjects from Sanaa city (96%)

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from Ma'ain, Bani-Alhareth, AND Al-Sabain districts Most cases are reported from DTCs (59300), ORCs (29547) Cases starts to appear in week 17 reaches a peak in weeks 24,25 and then slowly decreases. 155 suspected cholera cases were culture positives

Conclusion: 1. Cholera is one of the urgent health problems in Sana'a city

2. Cholera distribution is not gender sensitive, the most affected age group is (15-29) years, followed by (5-14) then under five

3. Cases are mainly distributed in Ma'ain, Bani-Alhareth, & Al-Sabain within Sana'a city (50% of the total cases).

4. The main cholera health care facilities are mainly DTCs and ORCs supported by WHO & UNICEF

5. Most of the subjects seek medical care within the first 2 days after onset of symptoms

6. The peak of cholera suspected cases is registered in weeks 24 & 24.

7. Confirmed cholera cases by culture are 155 from 655 specimen tested whereas 1984 are positive by cholera RDT

Recommendations:1. More cholera control interventions are necessary and urgent to eradicate it.

2. More field related research must be carried out to guide control and management interventions.

3. Some interventions must be concentrated on the age groups 5-14 & under five and at the most affected areas.

1. INTRODUCTION

Yemen is the poorest country in the Middle East and ranks 154 of 187 countries on the Human Development Index. High levels of poverty, poor education and low health outcomes have been exacerbated by years of unrest, insecurity and protracted displacement. The 'Arab Spring' reached Yemen in early 2011 and renewed violence and conflict caused a surge in displacements, placing increased pressure on the volatile and impoverished conditions already affecting millions of Yemenis. Although the situation has significantly changed since 2011, the Yemeni economy is caught in a jobless slow growth cycle, leading to stagnant per capita incomes and rising unemployment. Subsequently, poor households who already face accumulative chronic food insecurity have not been able to recover and large numbers of people are in need of assistance. Over ten million Yemenis are food insecure, 45% of the national population (YHRP, 2013). Of these, 5 million are severely food insecure and have limited or no access to sufficient, nutritious food [1].

The Yemen's Ministry of Public Health and Population (MoPH&P) confirmed a cholera outbreak in Amanat al Asimah Governorate in October 2016. Subsequently, the outbreak spread too close to 165 districts in 16 Governorates by the end of December 2016. The trend of the cholera outbreak and case-fatality rate then declined during the period January to March, with the number of districts reporting suspected cholera cases dropping to 25. The decline in the epidemic curve could be partly attributed to the health and WASH interventions. A total of 24,504 suspected cases, including 143 associated deaths (with a case-fatality rate of 0.44%) were reported by the end of March 2017. The resurgence of the outbreak during the last week of April resulted in a total of 14,000 suspected cases, with 186 associated deaths (1.6 % CFR) by 14 May, rapidly spreading to 180 districts (in 18 Governorates2). With the rapid spread, the cumulative number of cases during the two weeks period equal those reported over a period of the first months in the October 2016 outbreak [2].

From 27 April to 3 August 2017, 453,175 suspected cholera cases and 1,930 deaths (CFR: 0.4%) have been reported in 95.6% (22/23) of Yemen governorates, and 89.2% (297/333) of the districts.

The five most affected governorates were Amanat Al Asima, Al Hudaydah, Hajjah, Amran and Dhamar with 53% (239,877/453,175) of the cases reported since 27 April 2017. In Amanat al Asimah (Sana'a city) 55563 cases 61 deaths are registered in that period with case fatality rate 0.1% and attack rate 1.68% [3].

Lack of functional health care facilities is the main reason for the low availability of services for

the affected population. Out of 3,507 fixed health facilities in Yemen, 55% have either closed or are only partially functional. An estimated 30,000 local health workers have not been paid their salaries regularly for a year. Operational costs for more than 3,500 health facilities have not been paid [4].

2. OBJECTIVES

2.1 General Objective

To study Profile of suspected cholera patients in Sanaa city.

2.2 Specific Objectives

1. To determine the characteristics of suspected cholera patients by sex age and permanent address
2. To illustrate the distribution of patients by facility type
3. To Calculate the main period between onset of symptoms and date of entrance to health facility
4. To identify epidemiological curve of cholera cases.
5. To determine cholera laboratory investigation (RDT and culture) results.
6. To identify cholera cases management outcomes.

3. MATERIALS AND METHODS

A retrospective descriptive study had been carried out by using secondary analysis of available data collected from diarrhea treatment centers (DTCs), oral rehydration corners (ORCs) and other health facilities by department of epidemiological surveillance – Sanaa city health office.

Study subjects are all patients attending DTCs, ORCs, or other health facilities suffering from acute watery diarrhea in Sanaa city. They are 92995 patients during the period May-November 2017 according to inclusion criteria any patients with acute watery diarrhea (which is the case definition approved by the ministry of public health and subject and WHO).

Cholera rapid diagnostic test (Crystal®VC) used are those supplied by WHO for initial screening of cases they are produced in India by ARKRAY Healthcare Pvt. Ltd. It's a simple rapid and visual in vitro qualitative screening test for

detection lipopolysaccharide (LPS) antigen of vibrio cholera O1 (inaba & ogawa) & 0139 in human stool to diagnose cholera. See annex 1.

Stool culture for isolation and identification of vibrio cholera 01 or 0139 is the gold standard for the laboratory diagnosis of cholera. Carry Blair media is used for transport. a selective media is used for isolation and identification. a reagent is used for serogrouping [5].

Regarding medical ethics, data will be treated confidentially and for scientific research purposes only, will comply with the ethics of scientific research provided by manuals and handbooks of WHO and Helsinki declaration.

The study data technique was using available data collected from DTCs, ORCs, & other health facilitiesby department of epidemiological surveillance – Sanaa city health office. Data collection tools were related WHO medical records approved by MOPH&P. That includes name, age, sex, permanent address ….

Data collected from DTCs, ORCs, & other health facilities in Sanaa city during study period by epidemiological focal points in these facilities who have qualifications in health sector (diploma or more) and had been trained on data collection techniques and tools.

4. RESULTS

4.1 Suspected Cholera Patients' Characteristics

A total of 92995 suspected cholera patients were included in the study, where they are distributed by sex to 53% females (49501) and 47 % males (43494) as illustrated in Fig. 1.

Whereas the average age of study subjects was 22.7 years where standard deviation (SD) 18.8 and a range. In the distribution according to age group the most affected age group was (15-29), (5-14), (<5) and (30-44) by a percentage of 28%, 22%, 18.5% and 16% respectively. The distribution according to age group was as in Table 1 and Fig. 2.

According to the permanent address, the predominant of the study subjects from Sanaa city (96%), whereas 3% from Sanaa governorate and 1% from other governments as shown by Fig. 3.
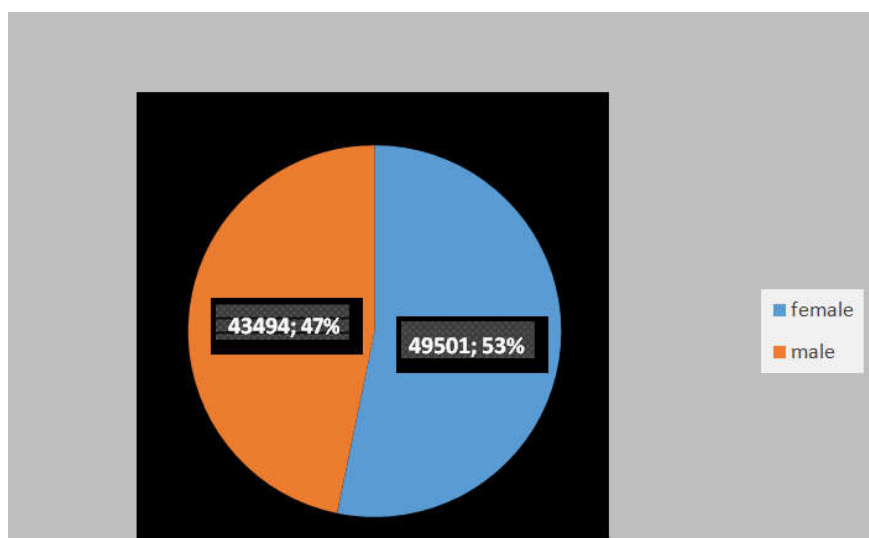
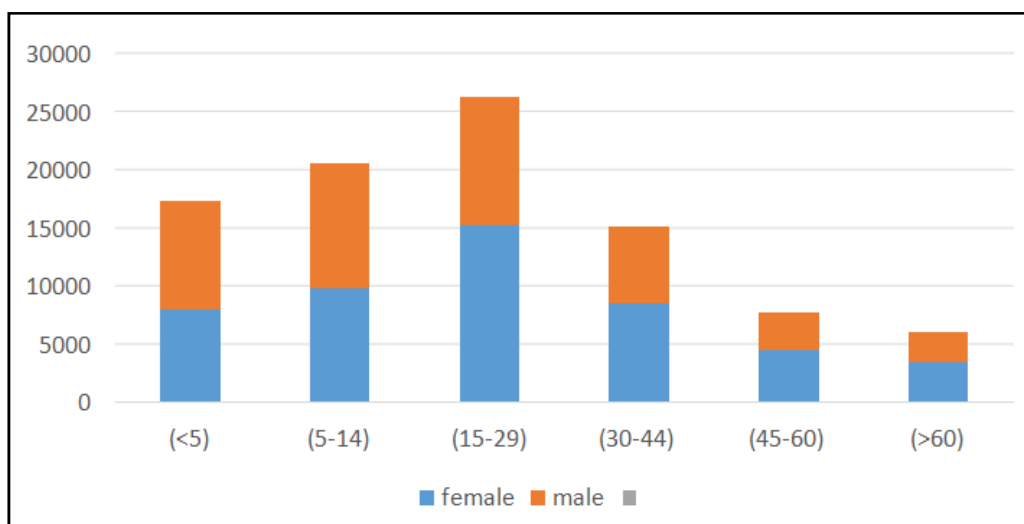**Fig. 1. Illustrate distribution of study subject by sex**

Fig. 2. Illustrate distribution of study population according to age group

In the city of Sanaa most cases from Ma'ain, Bani-Alhareth, AND Al- Sabain districts (18%, 17.2% and 15% respectively) as shown by Fig. 4.

4.2 Distribution of Study Subject by Health Facility Type

Most cases are reported from DTCs (59300), ORCs (29547) and to a lesser extent from other facilities (4148) as shown by Fig. 5.

4.3 Health Care Seeking Time

Most of the study subject seek medical advice within one day and in the same day (75% and 20.6%respectively)

4.4 Epidemiological Curve of Suspected Cholera Cases

Case starts to appear in week 17 reaches a peak in weeks 24,25 and then slowly decreases as shown by Fig. 7.

4.5 Cholera Laboratory Investigation Results

Cholera rapid diagnostic test was done for 5182 of them, 1984 were positive and 3198 negatives as shown by Fig. 8.

A total of 655 specimens were taken for culture at the national center of public health laboratories. Vibrio cholera (OGAWA subtype) were detected

in 155 specimens (23.6%) whereas no vibrio detected in 485 specimens (74%), no growth in 1 specimen and 14 are pending as shown in Fig. 9.

Table 1. Illustrate distribution of study subject by age group and sex

	male		female		total	
age group	count	%*	count	%*	count	%*
(<5)	9317	21.4	8038	16.2	17355	18.7
(5-14)	10786	24.8	9773	19.7	20559	22.1
(15-29)	11017	25.3	15235	30.8	26252	28.2
(30-44)	6563	15.1	8535	17.2	15098	16.2
(45-60)	3171	7.3	4522	9.1	7693	8.3
(>60)	2635	6.1	3398	6.9	6033	6.5
total	43489	100.0	49501	100.0	92990	100.0

The percentage was calculated from the vertical total
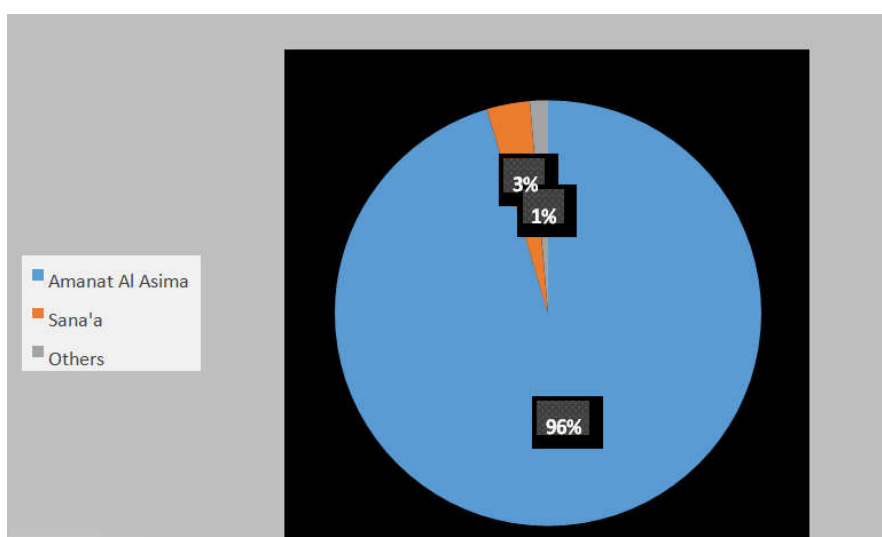
Fig. 3. Ilustrates distribution of study subjects according to permanent address
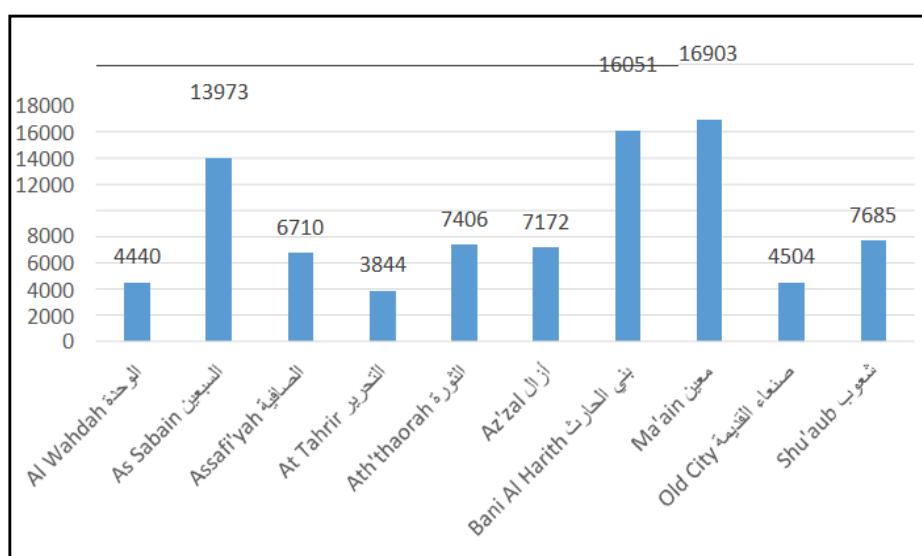
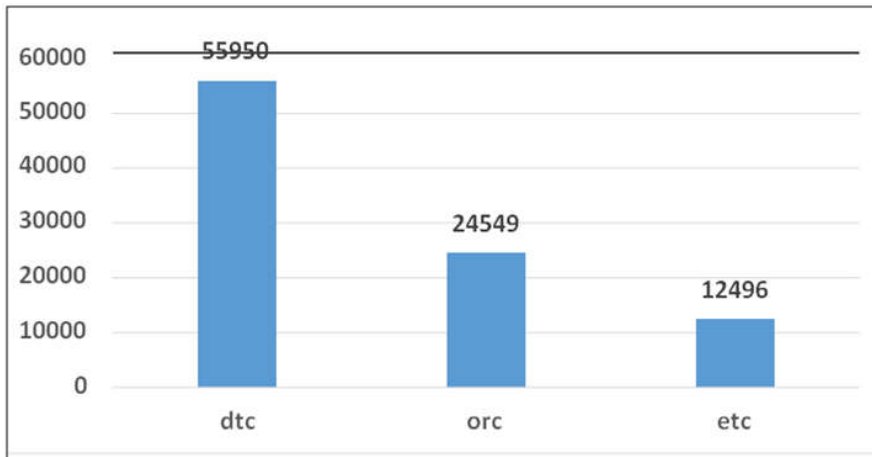**Fig. 4. illustrate distribution of study subject by district (n=92995)**

Fig. 5. Illustrates distribution of study subjects according to type of facility (n=92995)
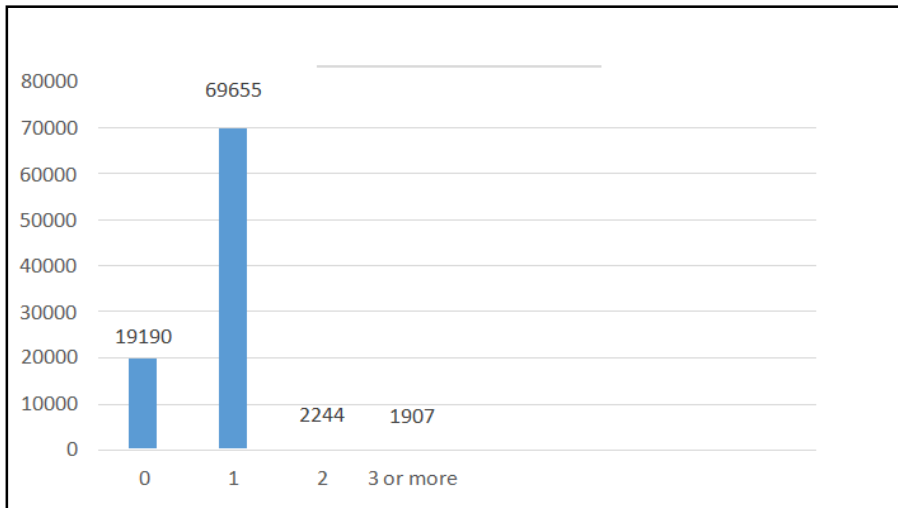*Most of the study subject were treated in DTCs (48%), ORCs (41.5), D other facilities (9.5%)*

Fig. 6. Illustrates no. of days between onset of symptoms and seeking medical advice (n=92995)
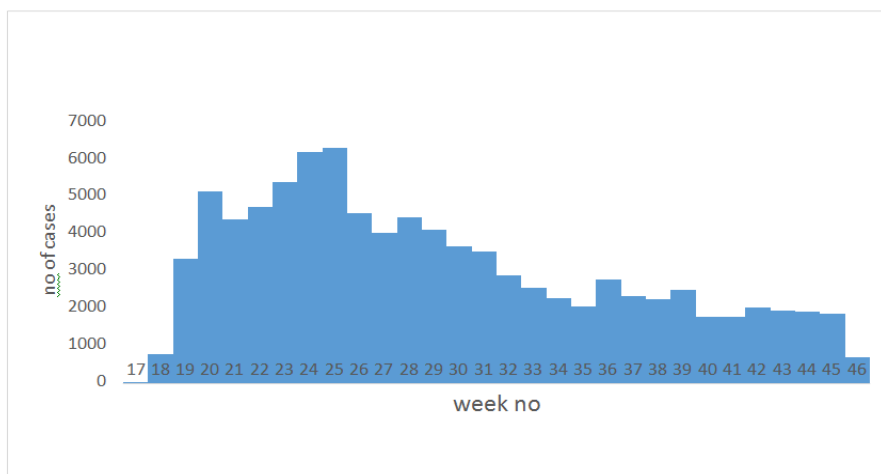

Fig. 7. Distribution of study subjects according to international weeks (n=92995)
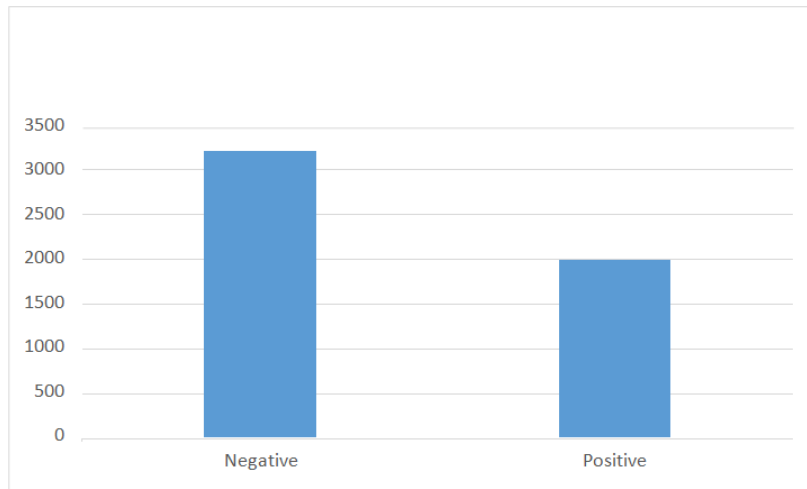
Fig. 8. Illustrate distribution of cholera rapid diagnostic test results (n=5182)
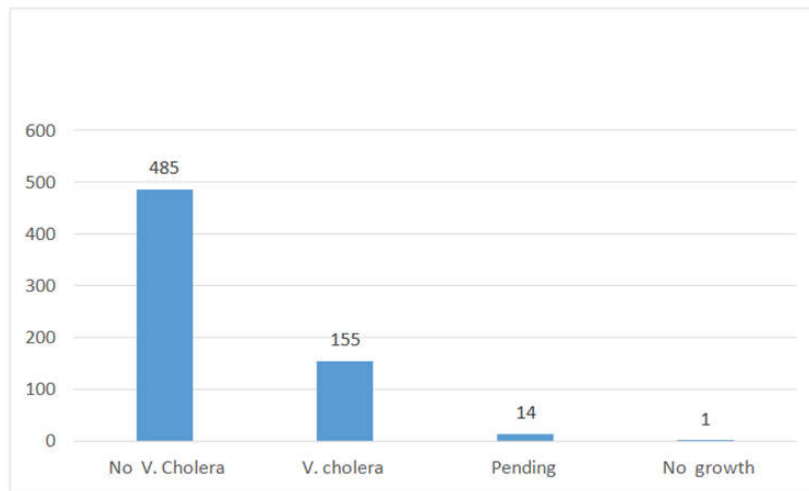

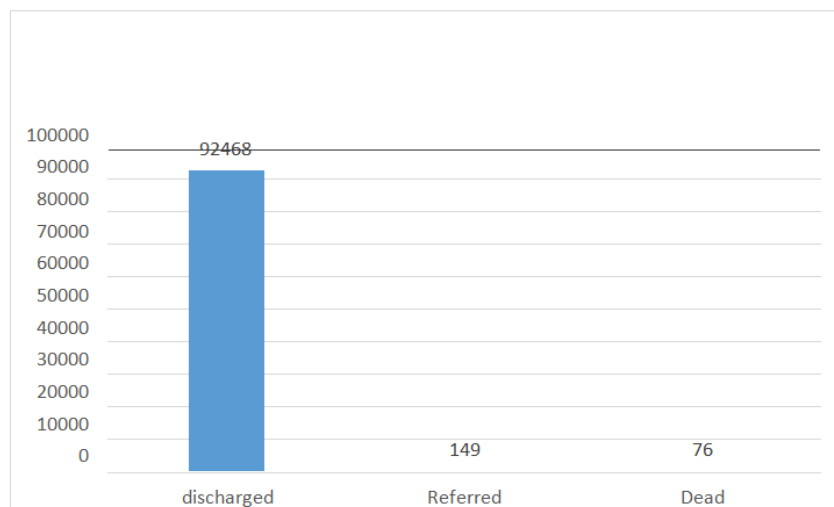**Fig. 9. Illustrate distribution of cholera laboratory test results (n=655)**

Fig. 10. Illustrates distribution of study subjects according to oytcome of treatment (n=92995)

4.6 Suspected Cholera Cases Management Outcomes

According to the outcome of treatment, the predominant of the cases were discharged (99.4%) and a total number of 76 deaths were recorded (0.08%) and 149 cases referred for additional care.

5. CONCLUSION

1. Cholera is one of the urgent health problems in Sana'a city
2. Cholera distribution is not gender sensitive, the most affected age group is (15-29) years, followed by (5-14) then under five
3. Cases are mainly distributed in Ma'ain, Bani-Alhareth, & Al-Sabain within Sana'a city (50% of the total cases).
4. The main cholera health care facilities are mainly DTCs and ORCs supported by WHO & UNICEF
5. Most of the subjects seek medical care within the first 2 days after onset of symptoms
6. The peak of cholera suspected cases is registered in weeks 24 & 24.
7. Confirmed cholera cases by culture are 155 from 655 specimen tested whereas 1984 are positive by cholera RDT

6. RECOMMENDATIONS

1. More cholera control interventions are necessary and urgent to eradicate it.
2. More field related research must be carried out to guide control and management interventions.
3. Some interventions must be concentrated on the age groups 5-14 & under five and at the most affected areas.

CONSENT AND ETHICAL APPROVAL

As per university standard guideline participant consent and ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. UN Office for the Coordination of Humanitarian Affairs, Yemen Humanitarian Response Plan(YHRP); 2013
2. Integrated response plan: Yemen Cholera Outbreak; 2017.
3. WHO. Yemen cholera outbreak: Daily epidemiology update; 2017. Available:http://www.emro.who.int/images/stories/Yemen_daily_epi_update _20170731.pdf?ua=1 (Accessed Aug. 3, 2017).
4. Health Cluster Bulletin; 2017.
5. CDC website Cholera diagnostic tools gold standard. "2013_Yemen_HRP.Pdf." Available:https://reliefweb.int/sites/reliefweb.int/files/resources/2013_Yemen_HRP.pdf "Cholera_integrated_response_plan_23may2017.Pdf." Available:https://reliefweb.int/sites/reliefweb.int/files/resources/cholera_integrated_response_plan_23may2017.pdf Diagnosis and Detection | Cholera | CDC; 2018. Available:https://www.cdc.gov/cholera/diagnosis.html "Yemen_daily_epi_update_20170731.Pdf." Available:https://reliefweb.int/sites/reliefweb.int/files/resources/Yemen_daily_epi_update_20170731.pdf. Zeida Abou. Health Cluster Bulletin August Al-Mekhlafi, Hesham M. "Yemen in a Time of Cholera: Current Situation and Challenges. 2017;3(5). The American Journal of Tropical Medicine and Hygiene. 2018;98(6):1558–62. Available:https://doi.org/10.4269/ajtmh.17-0811 "Cholera Response Dashboard | HumanitarianResponse; 2020. Available:https://www.humanitarianresponse.info/en/operations/yemen/cholera-response- dashboard Federspiel Frederik, Mohammad Ali. The Cholera Outbreak in Yemen: Lessons Learned and Way Forward. BMC Public Health 2018;18(1): 1338. Available:https://doi.org/10.1186/s12889-018-6227-6 Qadri Firdausi, Taufiqul Islam, John D. Clemens. Cholera in Yemen — an old foe rearing its ugly head. New

England Journal of Medicine. 2017; 377(21):2005–7.
Available:https://doi.org/10.1056/NEJMp17 12099
Seidlein, Lorenz von, David Sack, Andrew S. Azman, Louise C. Ivers, Anna Lena Lopez, Jacqueline L. Deen. Cholera Outbreak in Yemen. The Lancet Gastroenterology & Hepatology 2017; 2(11):777.
Available:https://doi.org/10.1016/S2468-1253(17)30287-X